



Document Title	HSD150PX17 Product Information	Page No.	1 / 29
Document No.		Revision	1.0

Hannstar Product Information

Model : **HSD150PX17-A05**

- Note:1.Please contact HannStar Display Corp. before designing your product based on this module specification.
- 2.The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by HannStar for any intellectual property claims or other problems that may result from application based on the module described herein.

Document Title	HSD150PX17 Product Information	Page No.	4 / 29
Document No.		Revision	1.0

1.0 GENERAL DESCRIPTION

1.1 Introduction

HannStar Display model HSD150PX17-A is a color active matrix thin film transistor (TFT) liquid crystal display(LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a 15.0 inch diagonally measured active display area with XGA resolution (768 vertical by 1024 horizontal pixel array) and can display up to 262,144 colors.

1.2 Features

- 15" XGA for Notebook PC
- LVDS interface.
- SPWG style-B standard
- High luminance
- Input timing: DE mode
- RoHS Compliance

1.3 Applications

- Notebook PC
- Moniputers
- Display terminals for AV applications
- Monitors for industrial applications

1.4 General information

Item	Specification	Unit
Outline Dimension	317.3 x 242.0 x 5.7 (Typ.)	mm
Display area	304.128(H) x 228.096(V)	mm
Number of Pixel	1024(H) x 768(V)	pixels
Pixel pitch	0.297(H) x 0.297(V)	mm
Pixel arrangement	RGB Vertical stripe	
Display color	6 Bits / 262,144	colors
Display mode	Normally white	
Surface treatment	Antiglare, Hard-Coating(3H)	
Weight	560 (Typ.)	g
Back-light	Single CCFL (Side-Light type)	
Input signal	1-ch LVDS with EDID(following SPWG)	
Power Consumption	Logic System	1.1 (typ.)
	B/L System	3.8 (typ.)

Document Title	HSD150PX17 Product Information	Page No.	5 / 29
Document No.		Revision	1.0

1.5 Mechanical Information

	Item	Min.	Typ.	Max.	Unit
Module Size	Horizontal(H)	316.8	317.3	317.8	mm
	Vertical(V)	241.5	242.0	242.5	mm
	Depth(D)	—	5.7	6.0	mm
Weight (Without inverter)		—	560	575	g
Torque of customer screw hole		—	---	1.8	Kgf•Cm

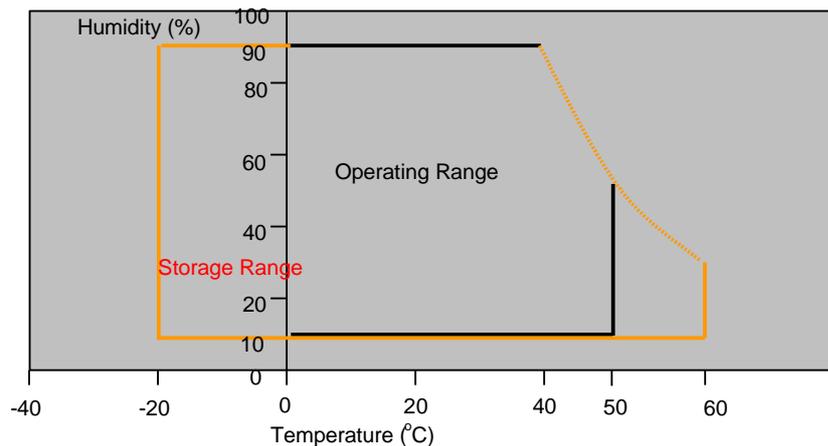
Document Title	HSD150PX17 Product Information	Page No.	6 / 29
Document No.		Revision	1.0

2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Absolute Rating of Environment

Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	T _{STG}	-20	60	°C	
Operating temperature	T _{OPR}	0	50	°C	(1)
Vibration(non-operating)	V _{NOP}	—	1.5	G	(2)
Shock(non-operating)	S _{NOP}	—	210	G	(3)
Storage humidity	H _{STG}	10	90	%RH	(3)
Operating humidity	H _{OP}	10	80	%RH	(4)
Low pressure(operating)	P _{LOP}	697	—	hPa	(5)
Low pressure(non-operating)	P _{LNOP}	116	—	hPa	(6)

Note (1) Storage / Operating temperature



- (2) 5-500-5Hz sine wave, X,Y,Z each directions, 30min/cycle.
- (3) 2ms, ±X, ±Y, ±Z direction, one time each. For this shock test, it is necessary to fill the silicon rubber between the shock jig as buffer.
- (4) Max wet bulb temp.=39°C
- (5) 2hrs. (10000 feet)
- (6) 24hrs. (50000 feet)

Document Title	HSD150PX17 Product Information	Page No.	7 / 29
Document No.		Revision	1.0

2.2 Electrical Absolute Rating

2.2.1 TFT LCD Module

Item	Symbol	Min.	Max.	Unit	Note
Power supply voltage	V_{DD}	-0.3	4.0	V	(1) (2)
Logic input voltage	V_{IN}	-0.3	$V_{DD}+0.3$	V	(1) (2)

2.2.2 Back-Light Unit

Item	Symbol	Min.	Max.	Unit	Note
Lamp voltage	V_{FL}	0	2000	$V_{(rms)}$	(1) (2)
Lamp current	I_L	3	7.0	mA	(1) (2)
		2	7.0	mA	(3)
Lamp frequency	f_L	0	100	KHz	(1) (2)

Note (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

(2) $T_a = 25 \pm 2^\circ\text{C}$

(3) Inverter : Burst Mode

Document Title	HSD150PX17 Product Information	Page No.	8 / 29
Document No.		Revision	1.0

3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Contrast		CR	$\Theta = 0$ Normal viewing angle	250	350	—		(1)(2)	
Response time	Rising	T_R		—	7	13	msec	(1)(3)	
	Falling	T_F		—	15	20			
White luminance (Average of 5 points)		Y_L			170	200	—	cd/m ²	(1)(4)(5) ($I_L=6.0mA$)
Color chromaticity (CIE1931)	Red	R_x			0.551	0.581	0.611		(1)(4)
		R_y			0.319	0.349	0.379		
	Green	G_x			0.288	0.318	0.348		
		G_y			0.515	0.545	0.575		
	Blue	B_x			0.130	0.160	0.190		
		B_y			0.121	0.151	0.181		
	White	W_x		0.280	0.310	0.340			
		W_y		0.300	0.330	0.360			
Viewing angle	Hor.	Θ_L	CR>10	35	40	—			
		Θ_R		35	40	—			
	Ver.	Θ_U		15	20	—			
		Θ_D		35	40	—			
Brightness uniformity		B_{UNI}	$\Theta = 0$	65	—	—	%	(6)	
Crosstalk		CT(n)	$\Theta = 0$	—	—	1.3	%	(7)	

3.2 Measuring Condition

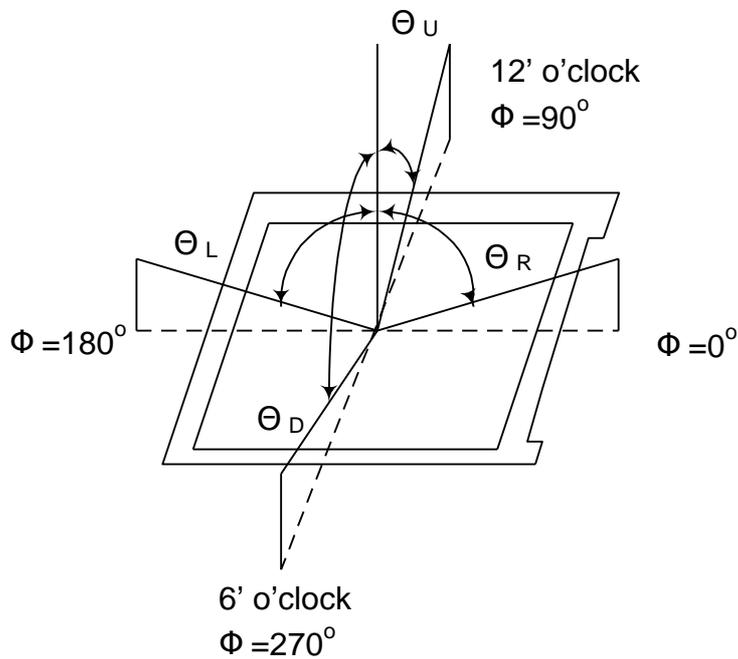
- Measuring surrounding : dark room
- Lamp current I_{FL} : $6.0 \pm 0.1mA$ (rms), Lamp freq. $F_L=50KHz$, Inverter : HIU-757-22pF
- $V_{DD}=3.3V \pm 0.05V$
- Ambient temperature : $25 \pm 2^\circ C$
- 30min. warm-up time.

Document Title	HSD150PX17 Product Information	Page No.	9 / 29
Document No.		Revision	1.0

3.3 Measuring Equipment

- Otsuka Electric Corp., which utilized MD3000V for Chromaticity and BM-5 for other optical characteristics.
- Measuring spot size : 10 ~ 12 mm

Note (1) Definition of Viewing Angle :

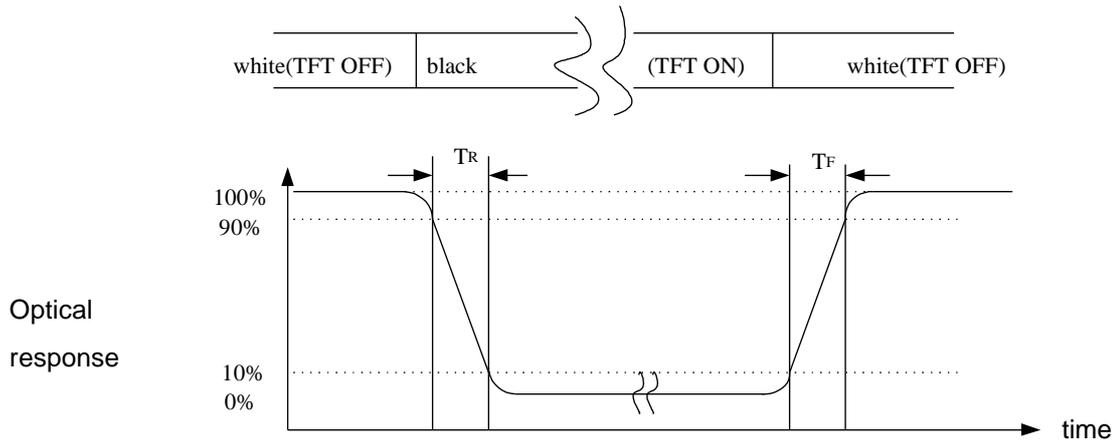


Note (2) Definition of Contrast Ratio(CR) :
measured at the center point of panel

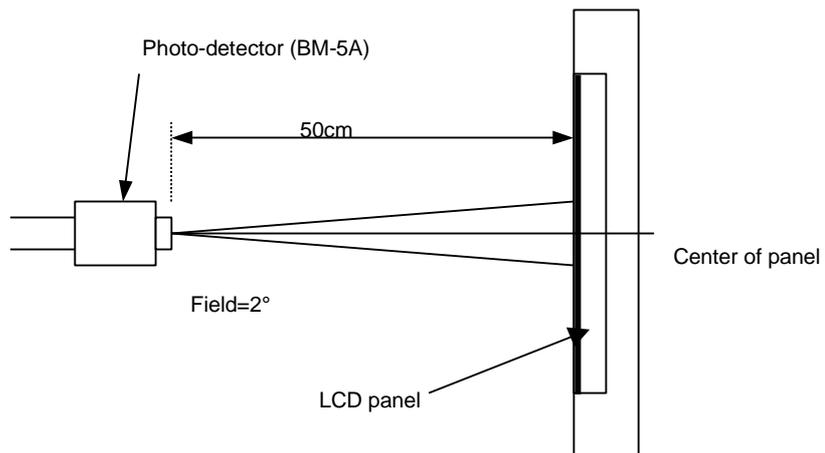
$$CR = \frac{\text{Luminance with all pixels white (L63)}}{\text{Luminance with all pixels black (L0)}}$$

Document Title	HSD150PX17 Product Information	Page No.	10 / 29
Document No.		Revision	1.0

Note (3) Definition of Response Time : Sum of T_R and T_F



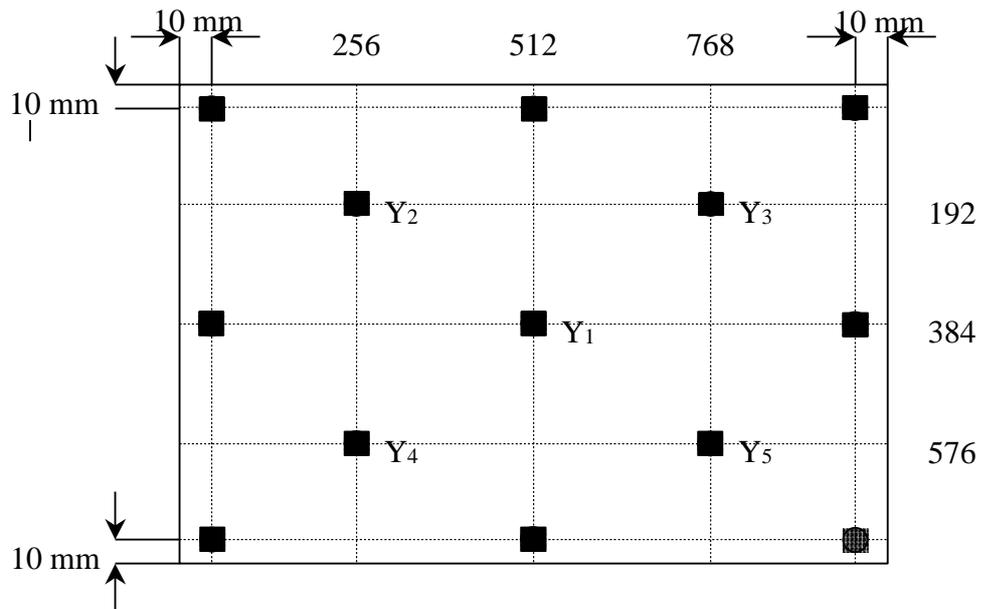
Note (4) Optical characteristic measurement setup



Document Title	HSD150PX17 Product Information	Page No.	11 / 29
Document No.		Revision	1.0

Note (5) Definition of Average Luminance of White (5 Point)

$$\text{Average Luminance} = \frac{Y_1+Y_2+Y_3+Y_4+Y_5}{5}$$



Note (6) Definition of brightness uniformity

$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 13 points})}{(\text{Max Luminance of 13 points})} \times 100\%$$

Document Title	HSD150PX17 Product Information	Page No.	12 / 29
Document No.		Revision	1.0

Note (7) Definition of crosstalk CT(1) ~ CT(4)

$$CT(n) = \frac{L(n) - LB(n)}{L(n)} \times 100\%, n = 1 \sim 4$$

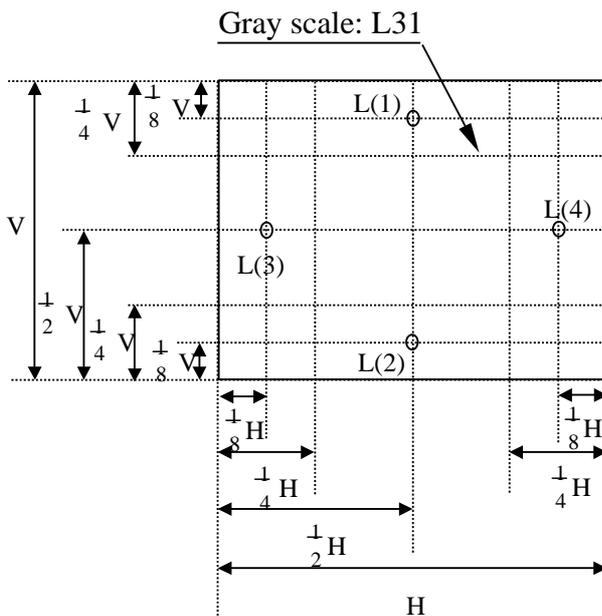
Where L(n) = Luminance of point "n" at pattern A (cd/m²), n=1 ~ 4

LB(n) = Luminance of point "n" at pattern B (cd/m²), n=1 ~ 4

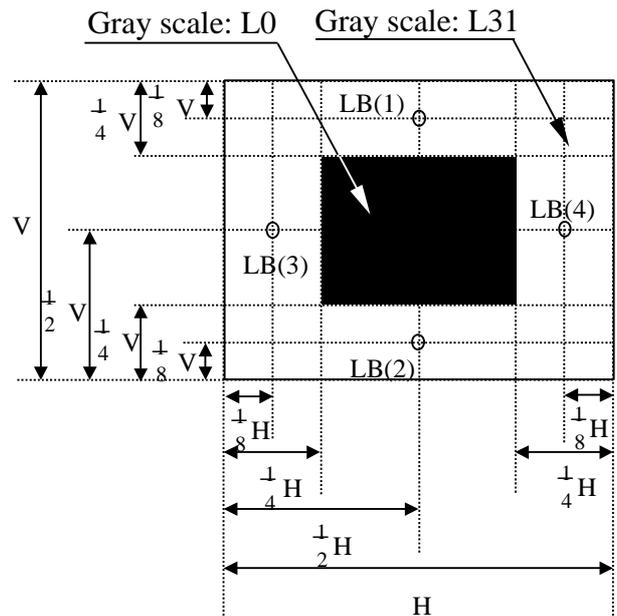
The location measured will be exactly the same in both patterns.

L0 : Luminance with all pixels black

L63 : Luminance with all pixels white



Pattern A

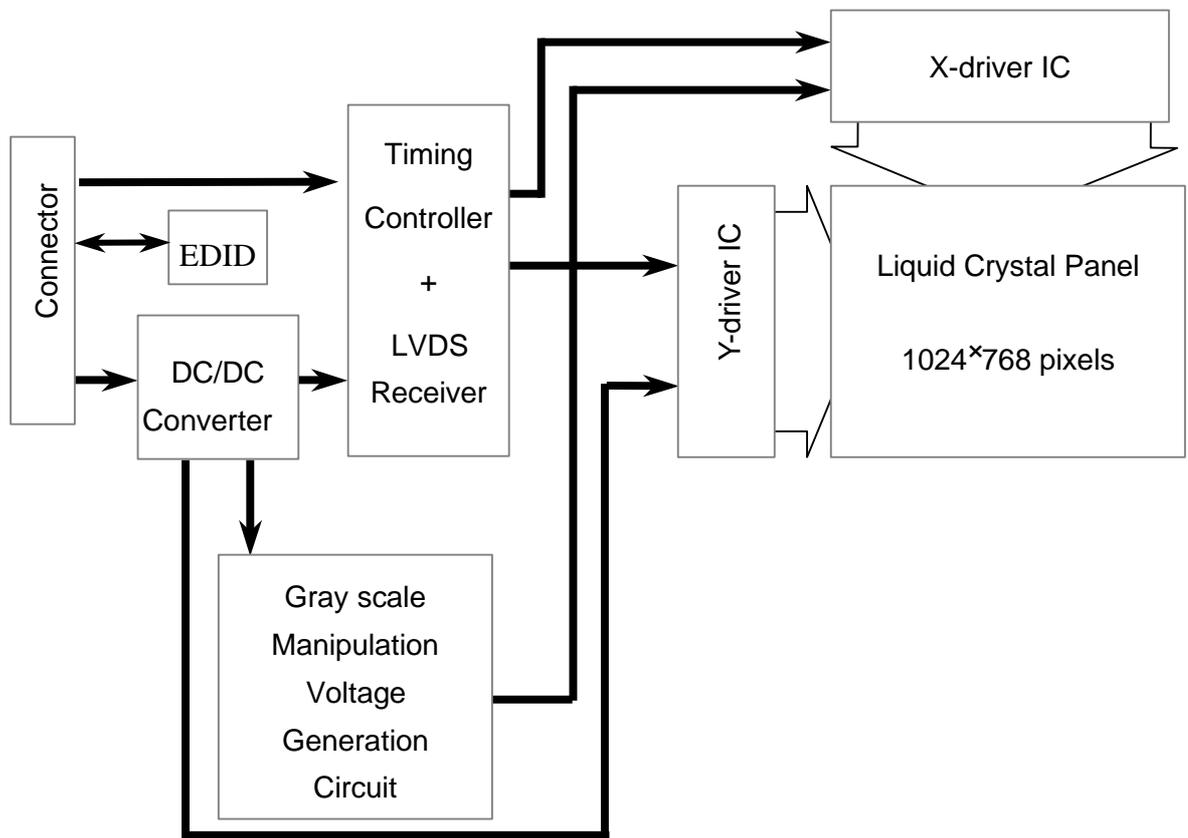


Pattern B

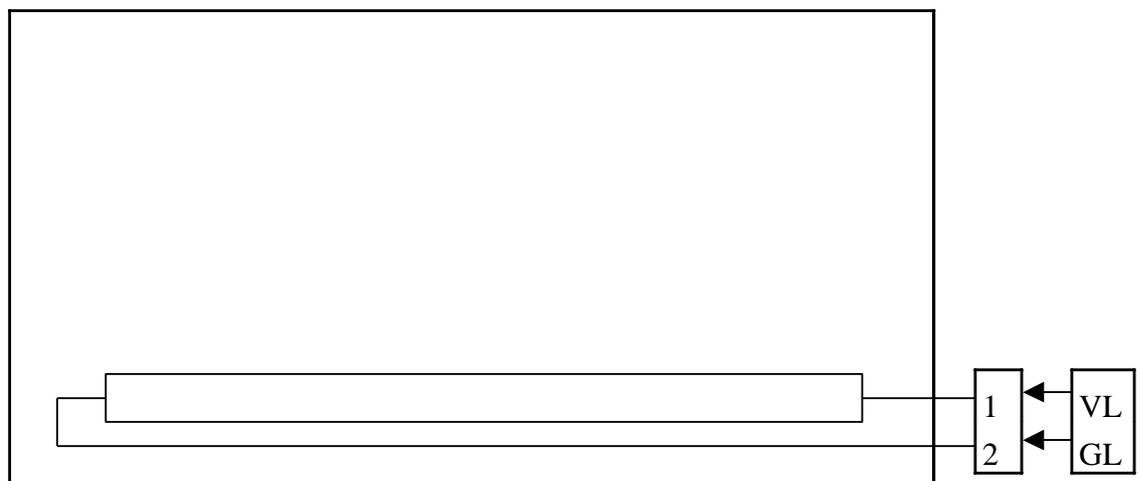
Document Title	HSD150PX17 Product Information	Page No.	13 / 29
Document No.		Revision	1.0

4.0 BLOCK DIAGRAM

4.1 TFT LCD Module

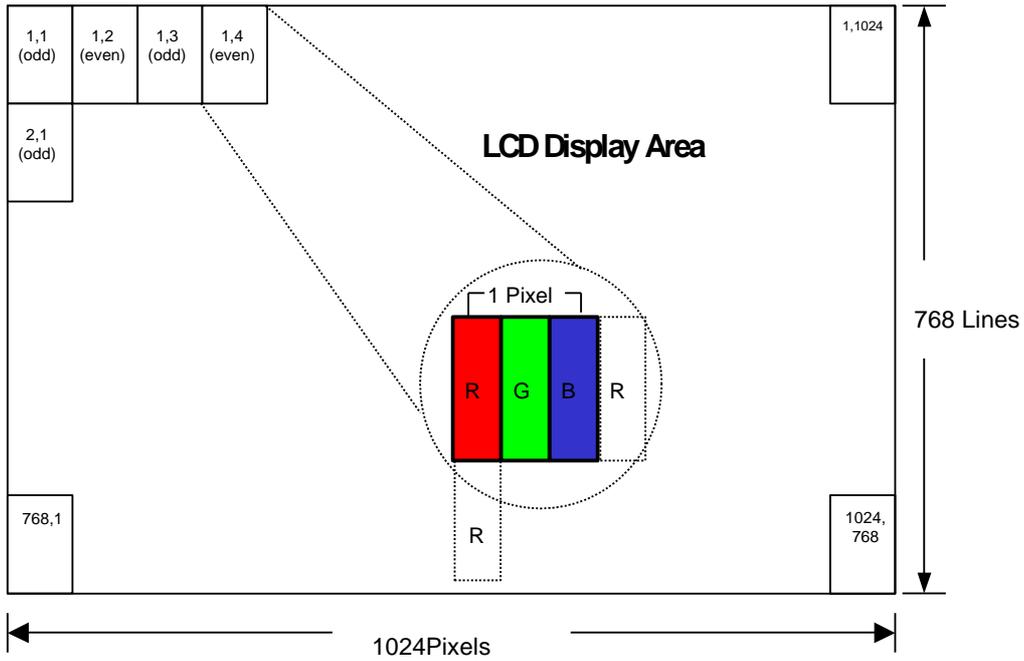


4.2 Back Light Unit



Document Title	HSD150PX17 Product Information	Page No.	14 / 29
Document No.		Revision	1.0

4.3 Pixel Format



Document Title	HSD150PX17 Product Information	Page No.	16 / 29
Document No.		Revision	1.0

5.0 INTERFACE PIN CONNECTION

5.1 TFT LCD Module

CN1 (INPUT SIGNAL): FI-XB30S-HF10 (JAE) or equivalent

MATING CONNECTOR: FI-X30M,FI-X30MR or equivalent

Terminal no.	Symbol	Function	Note
1	GND	Ground	
2	VDD	Power Supply : +3.3V	
3	VDD	Power Supply : +3.3V	
4	VEDID	DDC 3.3V power	
5	NC	Reserved for supplier test point	
6	ClkEDID	DDC clock	
7	DataEDID	DDC data	
8	Rin0-	- LVDS differential data input (R0-R5, G0)	(2)
9	Rin0+	+ LVDS differential data input (R0-R5, G0)	(2)
10	GND	Ground	
11	Rin1-	- LVDS differential data input (G1-G5, B0-B1)	(2)
12	Rin1+	+ LVDS differential data input (G1-G5, B0-B1)	(2)
13	GND	Ground	
14	Rin2-	- LVDS differential data input (B2-B5,NC,NC,DE)	(2)
15	Rin2+	+ LVDS differential data input (B2-B5,NC,NC,DE)	(2)
16	GND	Ground	
17	ClkIN-	- LVDS differential clock input	(2)
18	ClkIN+	+ LVDS differential clock input	(2)
19	GND	Ground	
20	NC	Reserved for supplier test point	
21	NC	Reserved for supplier test point	
22	GND	Ground	
23	NC	Reserved for supplier test point	
24	NC	Reserved for supplier test point	
25	GND	Ground	
26	NC	Reserved for supplier test point	
27	NC	Reserved for supplier test point	
28	GND	Ground	
29	NC	Reserved for supplier test point	
30	NC	Reserved for supplier test point	

Note (1) Please connects NC pin to nothing. Don't connect it to ground nor to other signal input. (NC pin should be open.)

Note (2) The module used a 100ohm resistor between positive and negative data lines of each receiver input.

5.2 Back-Light Unit

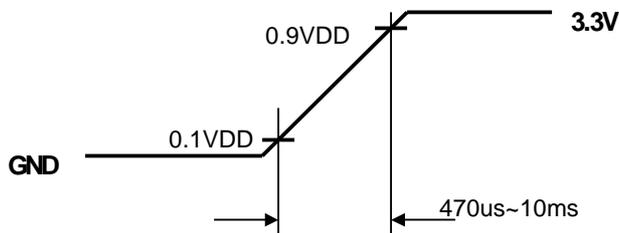
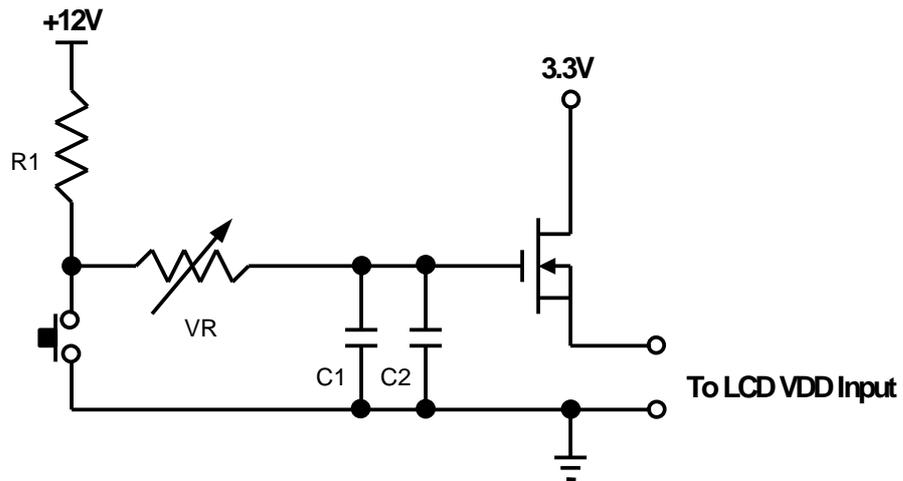
CN2 CCFL Power Source (**BHSR-02VS-1**) / JAPAN SOLDERLESS TERMINAL MFG CO., LTD. or equivalent

Mating Connector: (**SBHT-002T-P0.5**) / JAPAN SOLDERLESS TERMINAL MFG CO., LTD. or equivalent

Terminal no.	Symbol	Function
1	VL	CCFL power supply (high voltage)
2	GL	CCFL power supply (low voltage)

Document Title	HSD150PX17 Product Information	Page No.	18 / 29
Document No.		Revision	1.0

Note (2) Input Rush Current measurement condition



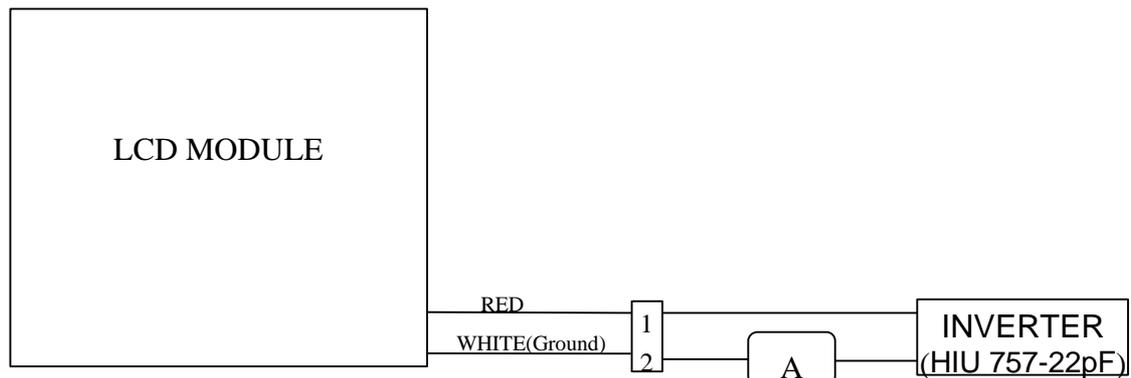
Document Title	HSD150PX17 Product Information	Page No.	19 / 29
Document No.		Revision	1.0

6.2 Back-Light Unit

The back-light system is an edge-lighting type with 1 CCFL(Cold Cathode Fluorescent Lamp). The characteristics of the lamp is shown in the following tables.

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Lamp current	IL	3.0	6.0	6.5	mA(rms)	(1)
		2.0	6.0	6.5	mA(rms)	(1.1)
Lamp voltage	VL	580	640	700	V(rms)	$I_L=6.0mA$
Frequency	fL	40	50	80	KHz	(2)
Operating lamp life time	Hr	10,000	—	—	Hour	(3)
Startup voltage	Vs	1250	—	—	V(rms)	at 25°C
		1400				at 0°C

Note (1) Lamp current is measured with current meter for high frequency as shown below. Specified valued are for a lamp.



Note (1.1) Inverter : Burst Mode

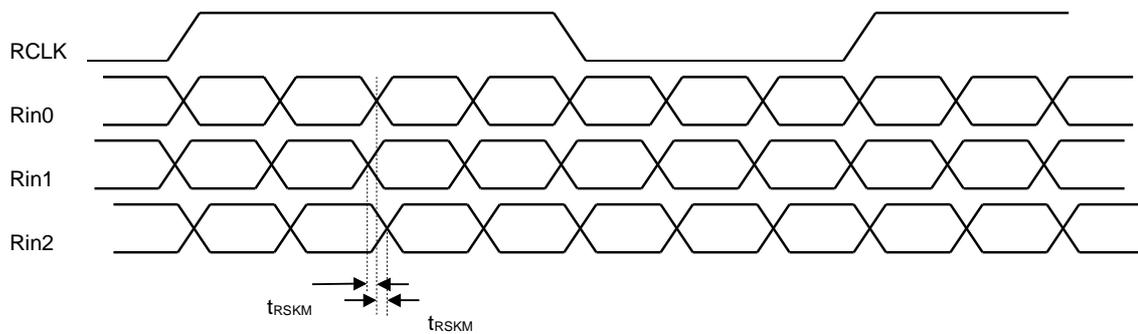
Note (2) Lamp frequency may produce interference with horizontal synchronous frequency and this may cause ripple noise on the display. Therefore lamp frequency shall be kept away from the horizontal synchronous frequency and its harmonics as far as possible in order to avoid interference.

Note (3) Lamp life time (Hr) can be defined as the time in which it continues to operate under the condition : $T_a=25\pm 3^\circ C$, $I_L=6.0mA(rms)$ and $f_L=50kHz$ until the brightness becomes less than 50%

Document Title	HSD150PX17 Product Information	Page No.	20 / 29
Document No.		Revision	1.0

6.3 Switching Characteristics for LVDS Receiver

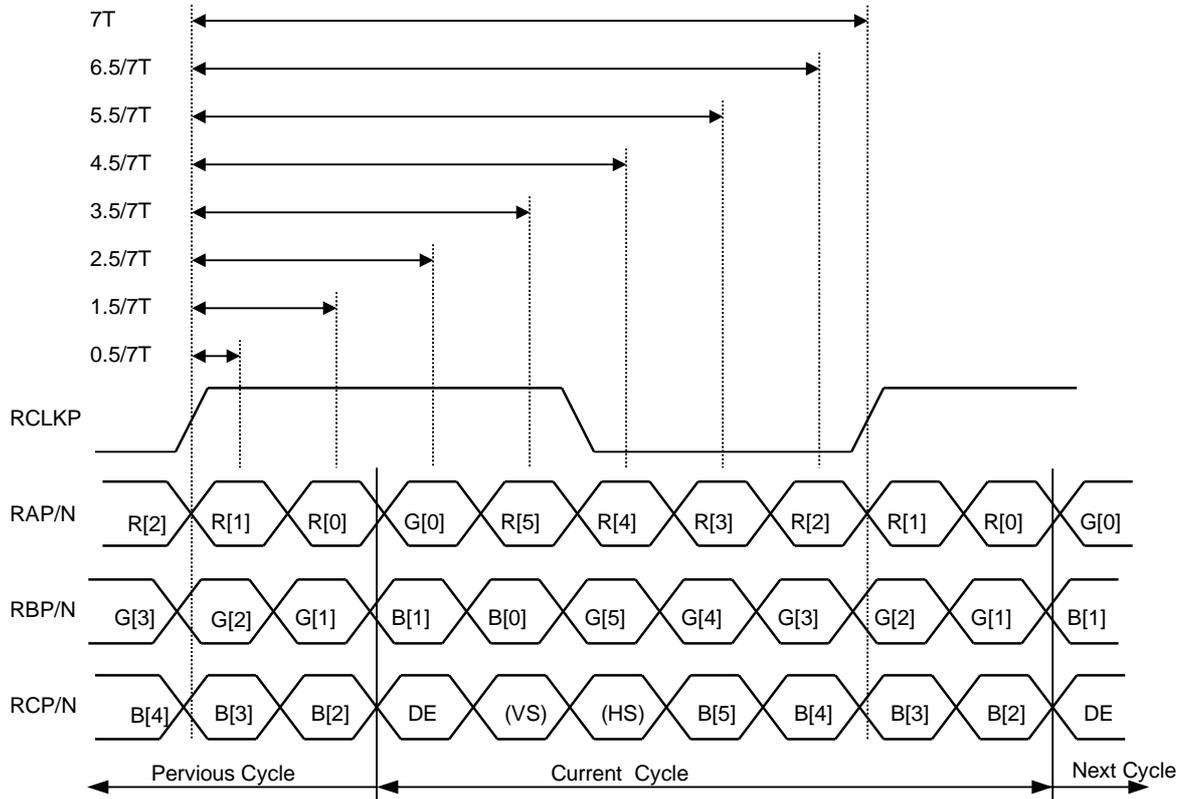
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	V_{th}	—	—	100	mV	$V_{CM}=1.2V$
Differential Input Low Threshold	V_{tl}	-100	—	—	mV	
Input Current	I_{IN}	—	—	± 10	μA	$V_{IN}=1.75V, V_{DD}=3.6V$
		—	—	± 10	μA	$V_{IN}=0.8V, V_{DD}=3.6V$
Input Voltage Range(Signal ended)	V_{IN}	$1.1-(V_{ID})/2$	—	$1.45+(V_{ID})/2$	V	
Differential input Voltage	$ V_{ID} $	100	—	600	V	
Common Mode Voltage Offset	V_{CM}	1.0	—	1.45	V	
Clock Frequency	f_c	—	54	—	MHz	
LVDS Skew Margin	t_{RSKM}	—	—	400	pS	At $f_c=54MHz$
LVDS Input Clock Jitter Tolerance	—	—	—	± 2.5	%	center spread



LVDS Receiver skew margin

Document Title	HSD150PX17 Product Information	Page No.	21 / 29
Document No.		Revision	1.0

6.4 Bit Mapping & Interface Definition



Bit Mapping & Timing Definition

Document Title	HSD150PX17 Product Information	Page No.	22 / 29
Document No.		Revision	1.0

6.5 Interface Timing (DE mode)

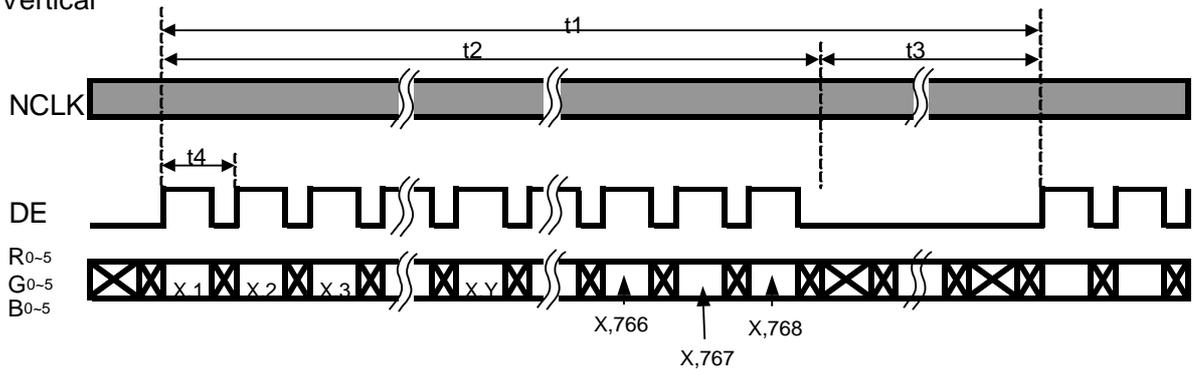
1)2)3)4)5)6)

Item	Symbol	Min.	Typ.	Max.	Unit
Frame Period	t1	803	806	809	line
Vertical Display Time	t2	—	768	—	line
Vertical Blanking Time	t3	—	38	—	line
1 Line Scanning Time	t4	1287	1344	1400	CLK
Horizontal Display Time	t5	—	1024	—	CLK
Horizontal Blanking Time	t6	—	320	—	CLK
Clock Period	t7(CLK)	14.715	15.385	16.127	ns

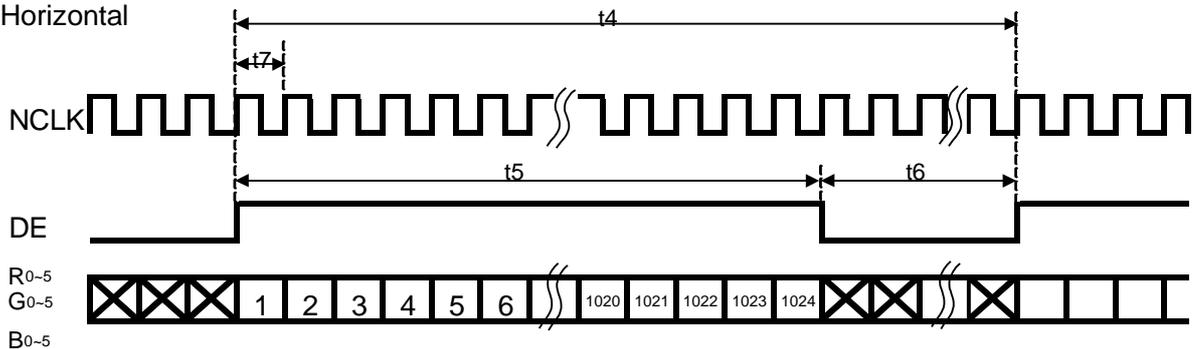
(frame rate=60Hz)

Timing Diagram of Interface Signal (DE mode)

(1)Vertical

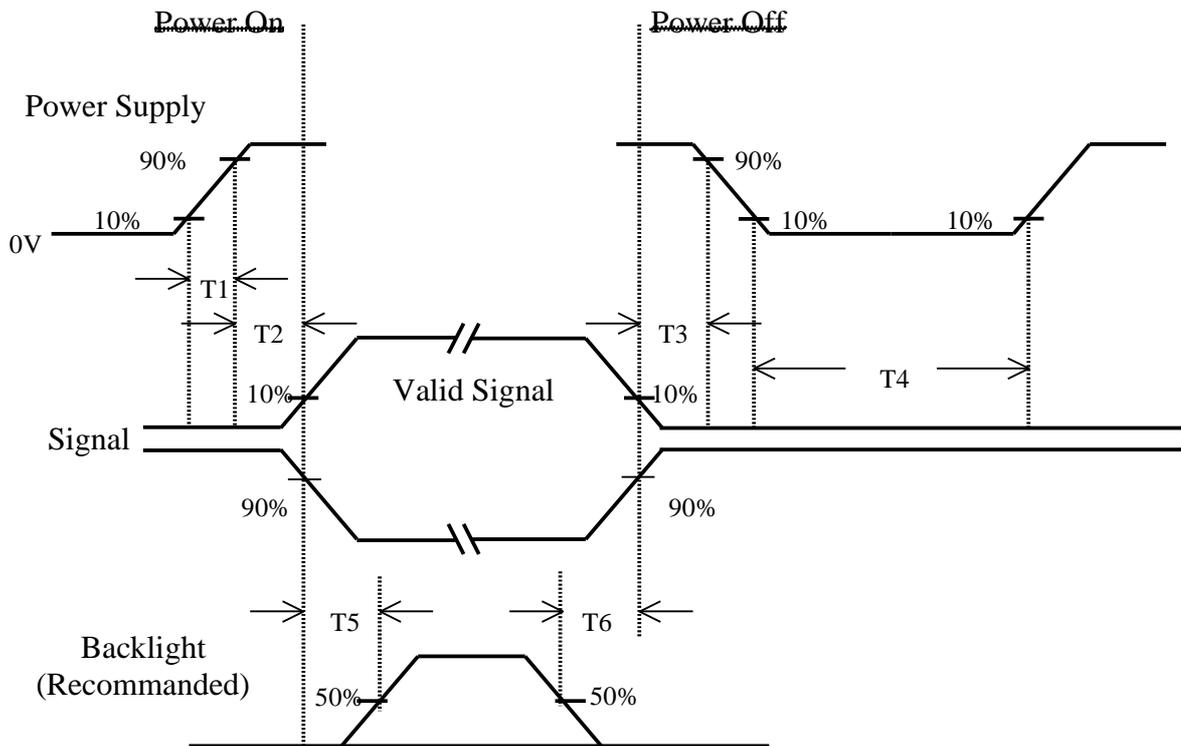


(2)Horizontal



Document Title	HSD150PX17 Specification for ASUS	Page No.	23 / 29
Document No.	DC130-1277	Revision	1.0

6.6 Power ON/OFF Sequence



Power ON/OFF Sequence

$0.5\text{msec} < T1 \leq 10 \text{ msec}$

$0 < T2 \leq 50 \text{ msec}$

$0 < T3 \leq 50 \text{ msec}$:

$400 \text{ ms} \leq T4$

Back-light:

$200 \text{ ms} \leq T5$

$200 \text{ msec} < T6$

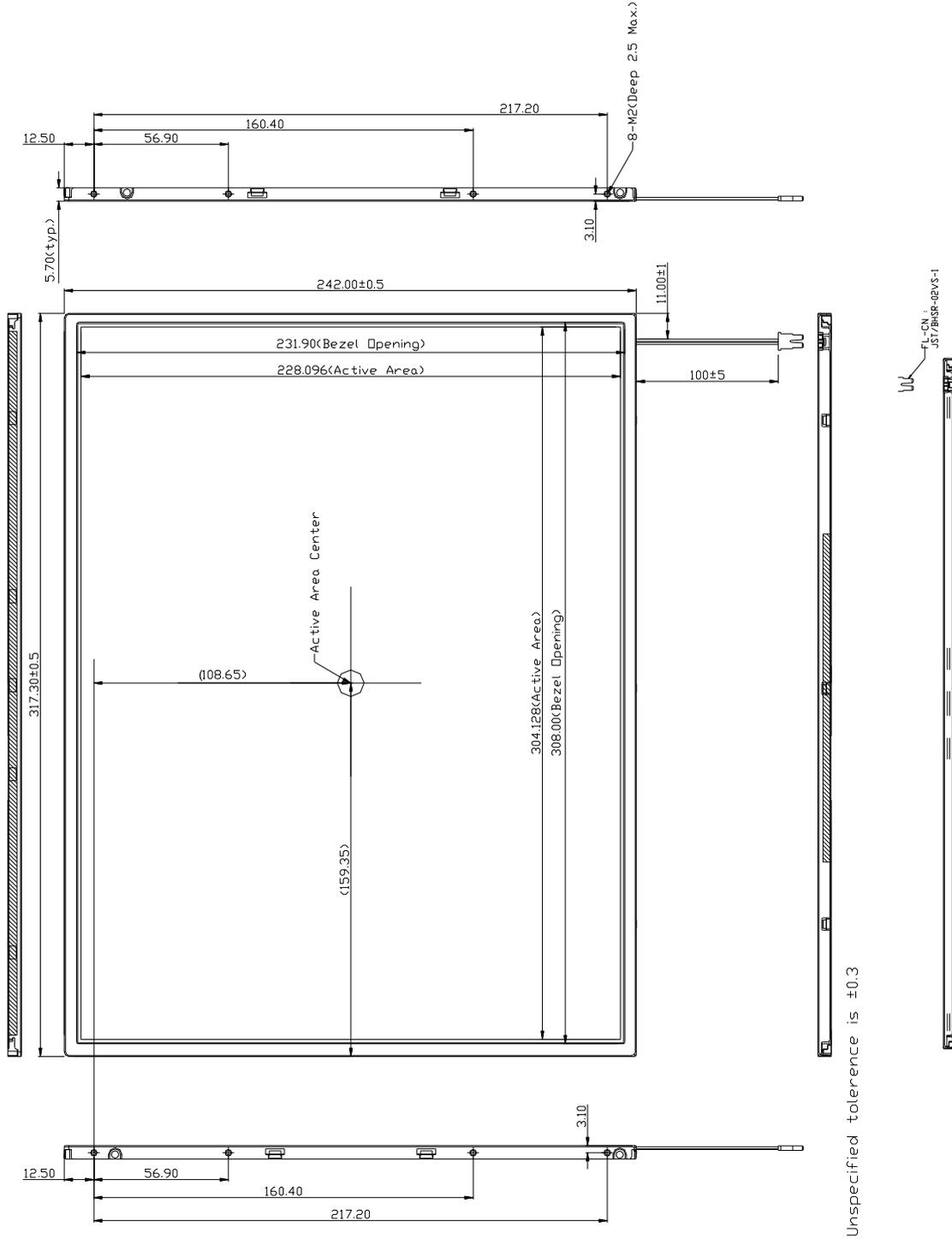
- Note (1) Apply the lamp voltage within the LCD operation range. When the back-light turns on before the LCD operation or the LCD turns off before the back-light turns off, the display may momentarily become white.
- (2) In case of $V_{DD} = \text{off level}$, please keep the level of input signal on 0 voltage.
- (3) T4 should be measured after the module has been fully discharged between power off and on period.

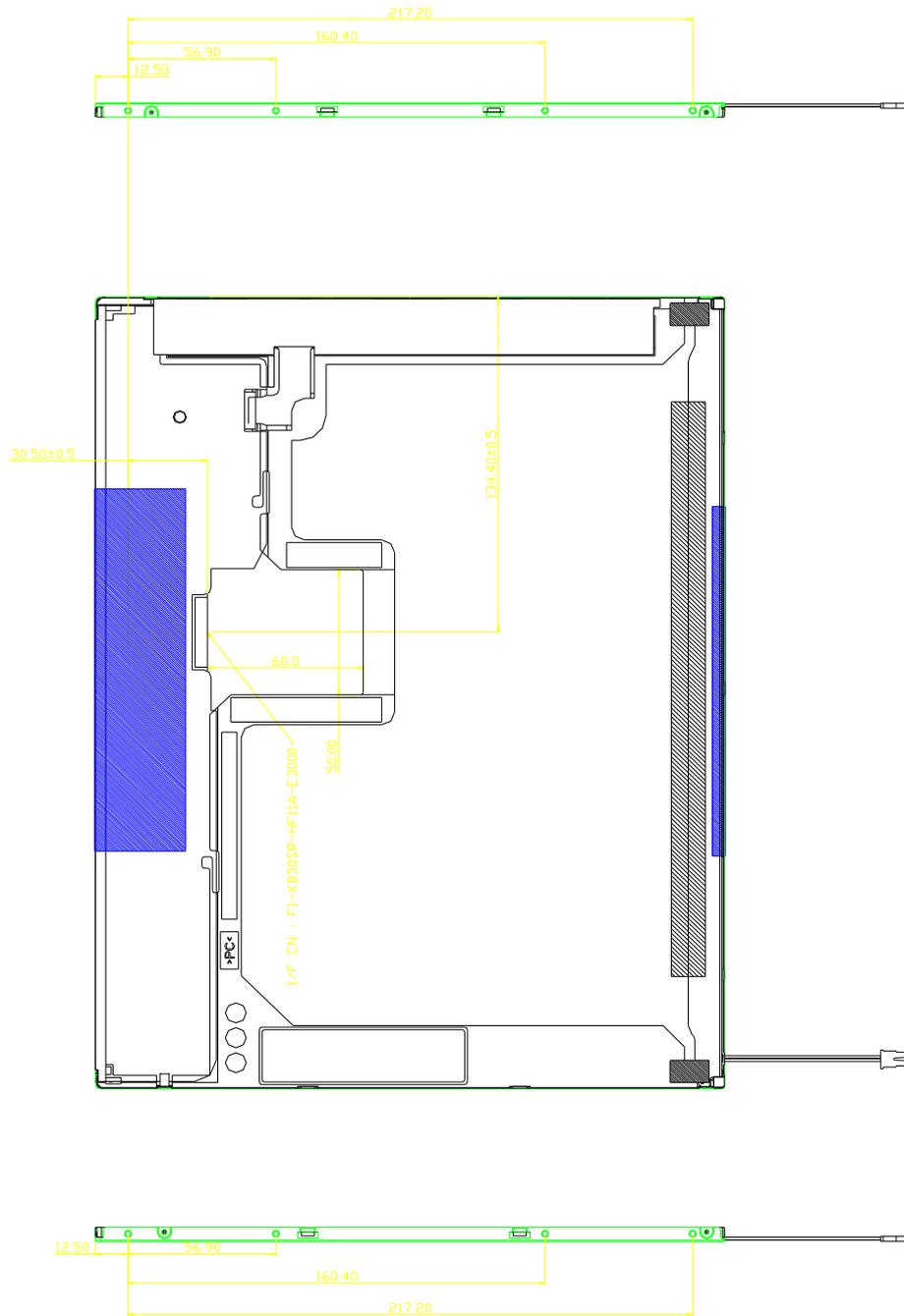
Document Title	HSD150PX17 Specification for ASUS	Page No.	24 / 29
Document No.	DC130-1277	Revision	1.0

7.0 OUTLINE DIMENSION

7.1 Front View Outline Dimension

U Unit : mm





Document Title	HSD150PX17 Specification for ASUS	Page No.	26 / 29
Document No.	DC130-1277	Revision	1.0

8.0 LOT MARK

8.1 Lot Mark



code 1,2,3,4,5,6: HannStar internal flow control code.

code 7: production location.

code 8: production year.

code 9: production month.

code 10,11,12,13,14,15: serial number.

Note (1) Production Year

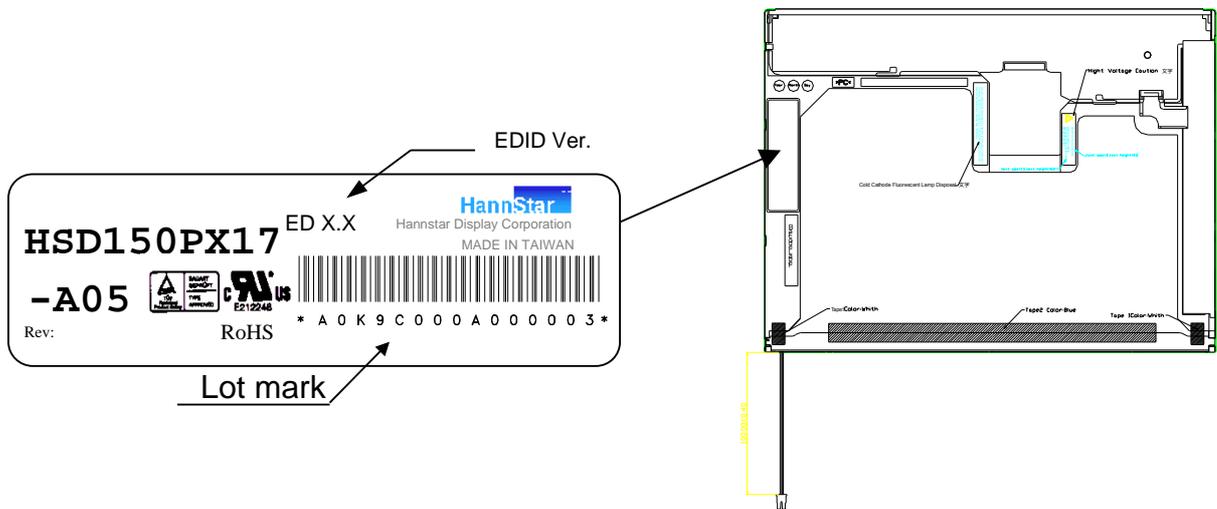
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Mark	9	0	1	2	3	4	5	6	7	8

Note (2) Production Month

Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct	Nov.	Dec.
Mark	1	2	3	4	5	6	7	8	9	A	B	C

8.2 Location of Lot Mark

- (1) The label is attached to the backside of the LCD module.
- (2) This is subject to change without prior notice.
- (3) "EDID.XX"; The EDID Version tend to change if EDID content is modified.



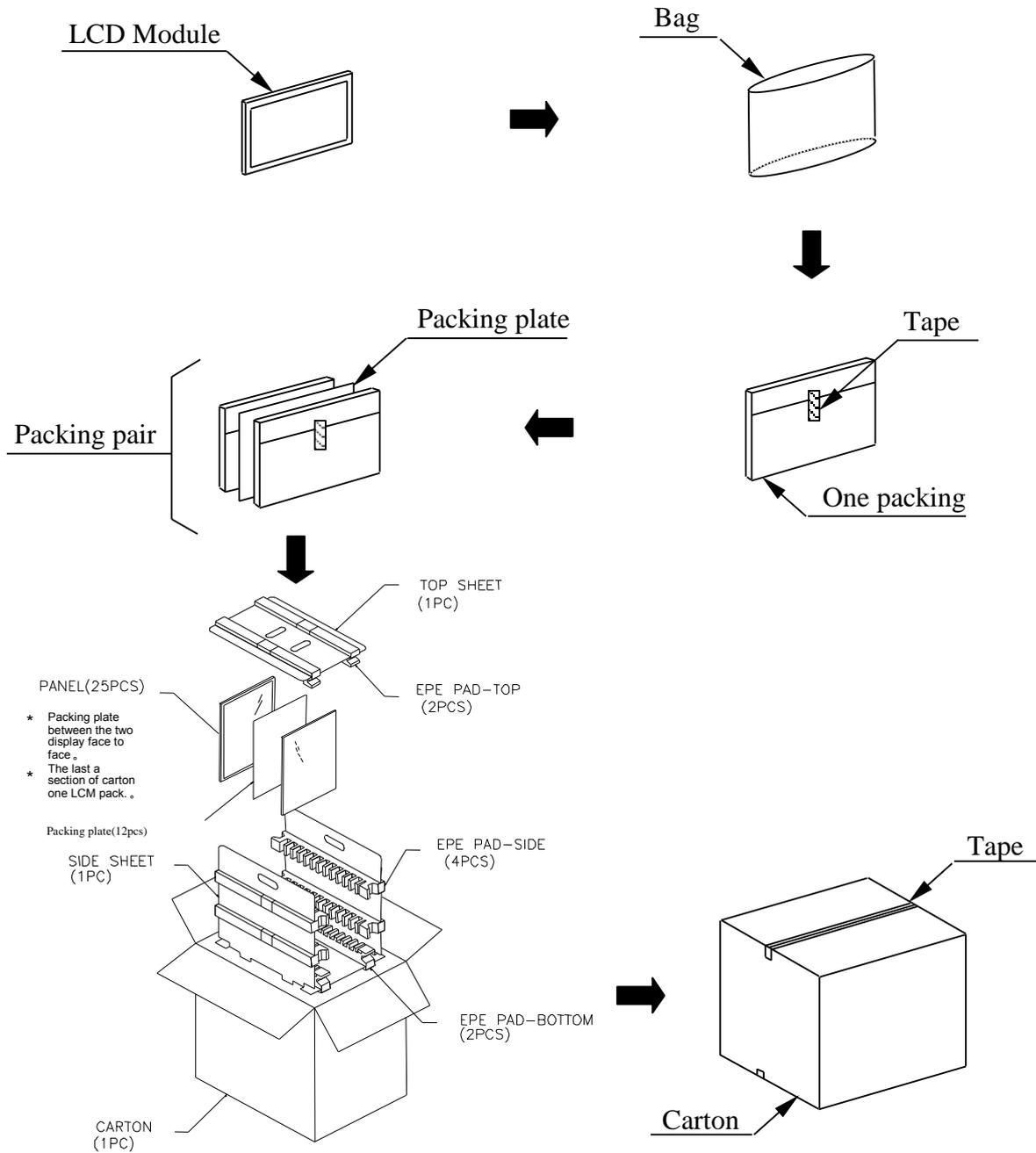
Document Title	HSD150PX17 Specification for ASUS	Page No.	27 / 29
Document No.	DC130-1277	Revision	1.0

9.0 PACKAGE SPECIFICATION

9.1 packing form

- (1) package quantity in one carton: 25 pieces.
- (2) carton size: 464±3 mm×360±3 mm×431^H±3 mm.
- (3) for domestic transportation only.

9.2 packing assembly drawings



Document Title	HSD150PX17 Specification for ASUS	Page No.	28 / 29
Document No.	DC130-1277	Revision	1.0

10.0 GENERAL PRECAUTION

10.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

10.2 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. HannStar does not warrant the module, if customers disassemble or modify the module.

10.3 Breakage of LCD Panel

- 2.2.1 If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.
- 2.2.2 If liquid crystal contacts mouth or eyes, rinse out with water immediately.
- 2.2.3 If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.
- 2.2.4 Handle carefully with chips of glass that may cause injury, when the glass is broken.

10.4 Electric Shock

- 10.4.1 Disconnect power supply before handling LCD module.
- 10.4.2 Do not pull or fold the CCFL cable.
- 10.4.3 Do not touch the parts inside LCD modules and the fluorescent lamp's connector or cables in order to prevent electric shock.

10.5 Absolute Maximum Ratings and Power Protection Circuit

- 10.5.1 Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.
- 10.5.2 Please do not leave LCD module in the environment of high humidity and high temperature for a long time.
- 10.5.3 It's recommended to employ protection circuit for power supply.

10.6 Operation

- 10.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead.
- 10.6.2 Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.
- 10.6.3 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

Document Title	HSD150PX17 Specification for ASUS	Page No.	29 / 29
Document No.	DC130-1277	Revision	1.0

10.6.4 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.

10.6.5 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

10.7 Mechanism

Please mount LCD module by using mouting holes arranged in four corners tightly.

10.8 Static Electricity

10.8.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

10.8.2 Because LCD module use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

10.9 Strong Light Exposure

The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

10.10 Disposal

When disposing LCD module, obey the local environmental regulations.